

Consultation response: 'Cost of Energy Review'

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This paper is intended to inform decision-makers in the public, private and third sectors. The views expressed represent those of the authors and do not necessarily represent those of the host institutions or funders.

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This is a submission by the ESRC Centre for Climate Change Economics and Policy and the Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science to the consultation on the independent *Cost of Energy Review* by Professor Dieter Helm, which was published on 25 October 2017. The UK Department for Business, Energy & Industrial Strategy initiated a call for evidence in November 2017, seeking views on the matters that the Government should take into account in considering how to reduce the cost of energy in the longer term. Our responses to certain areas of the Review are set out below.

The author's approach to the Review

The *Cost of Energy Review* by Professor Dieter Helm represents a personal manifesto for the UK power sector, rather than a synthesis of the best expert analysis. The author is transparent about this, stating in the Preface and Acknowledgements that: 'The review is not, and was never intended to be, a comprehensive summary of the views of the experts, professionals, energy businesses, customers, and the many vested interests that have grown up around the electricity industry.' As such, the analysis has many strengths, but also suffers from some significant weaknesses that may have been addressed by the author if he had consulted other experts in the field. Some of the major conclusions and recommendations should not be a surprise to the Government as they are drawn from the author's previous pronouncements about the energy sector.

The phase-out of coal from electricity generation

The Helm Review criticises the size of the expenditure to date on subsidies for the deployment of immature renewable technologies. However, it does not offer any alternative mechanisms that potentially would have been more cost-effective. His argument that decarbonisation of the power sector should have focused on phasing out coal for natural gas does not address the issue of how deployment of renewables should have been managed. Indeed a focus on the transition from coal to gas might have meant that a much smaller proportion of electricity would be generated by renewables today. The observation that the cost of renewables has dropped is, puzzlingly, presented by the Helm Review as a criticism of earlier investments, which he labels 'legacy costs'. He does not explain how the costs would have dropped without the initial investments.

On an output basis, the percentage of total electricity generated by coal fell from 22.4 per cent in 2015 to 9.0 per cent in 2016. This compares with 39.2 per cent in 2012. Although the proportion of electricity generated by renewables rose from 8.1 per cent in 2012 to 25.7 per cent in 2016, the share from natural gas increased from 27.5 to 42.2 per cent over the same period. The latest projections published by the Department for Business, Energy & Industrial Strategy (2018) show, in the reference scenario, that coal will be phased out completely by 2025 and the proportion of total UK electricity supply annually from natural gas is due to decrease from 47.4 per cent in 2017 to 27.2 per cent in 2025 and 15.2 per cent in 2035. Hence, coal will have been phased out using natural gas as a 'bridge' to a low-carbon power sector dominated by nuclear and renewables.

The costs of renewable electricity generation

The Helm Review is correct in identifying a mismatch between the market failures that hinder new low-carbon alternatives to fossil fuels, and the implementation of the subsidies that are intended to help overcome them. Most renewable technologies are capital-intensive: most of the costs are incurred during the construction of the wind turbines or solar panels, while the ongoing operating

and maintenance costs are relatively low. The subsidies are not paid upfront, but are promised as a revenue stream in return for electricity generation over an extended period.

The Helm Review suggests that a more efficacious approach would be to offer capital grants and special tax regimes for capital expenditure. It suggests that after the existing contracts for low-carbon electricity generation have been honoured, feed-in tariffs and low-carbon Contracts for Difference should be restructured according to their three phases (the construction and project-development phase, the operation of the plant, and decommissioning), with capital support and tax concessions for the project development and construction phases. The Helm Review suggests a refinancing arrangement would be put in place after the completion of a project so that customers can benefit from the relatively low marginal cost of electricity generation from renewables.

Such an arrangement makes some sense, because separating out the fixed costs of project development from the relatively low marginal costs associated with renewable energy production could offer some benefits for electricity consumers if their bills did not include subsidies to cover the capital costs. However, the wholesale price of electricity, which is a major determinant of the price that consumers pay, currently depends on fossil fuels, which create a higher marginal cost for electricity generation. It is unclear, therefore, that changing the pricing structure for renewables only will result in significant benefits for consumers, particularly given how quickly the levels of subsidies for renewables are falling.

The results of the second auction of Contracts for Difference revealed a strike price for offshore wind of £57.50/MWh (in 2012 prices) for delivery in 2022–23, compared with £119.89/MWh hour (in 2012 prices) for delivery in 2017–18 through the first auction. Renewables are quickly approaching the point at which they will not need subsidies, particularly if fossil fuels are subject to a strong carbon price. If consumers are to benefit from the low operating costs of renewables, the Government will need to reform the electricity market so that the wholesale price is not dependent on the marginal costs of fossil fuels.

Addressing the intermittency of renewable electricity generation

The Helm Review recommends that renewable electricity generators should eventually be made responsible for managing the costs of intermittent output, an idea that the author has proposed many times before (e.g. Helm, 2015). This would be the result of combining the auctions for low-carbon deployment with those for capacity, to create a single 'equivalent firm power capacity auction'. To do so would require, for instance, the owners of offshore wind farms to enter into arrangements to provide power to the network from alternative sources at times when wind speeds are too low to do so. However, this would likely create unnecessary additional costs, as balancing costs arise at a system level rather than for individual wind farms.

Nonetheless, renewables with variable electricity generation output, such as wind and solar, do create further system costs. The size of such costs is context-specific, depending on climatic factors, demand profiles and the wider mix of generation. A systematic review undertaken by the UK Energy Research Centre (Heponstall et al., 2017) found that, in UK conditions, these costs would be of the order of £10 per megawatt-hour of intermittent renewable output if 30 per cent of electricity were supplied by variable renewables. About 14 per cent of electricity in the UK was generated by variable renewables in 2016. Costs rise at higher penetrations and are significantly larger if the system is inflexible. At present these costs are socialised and not directly borne by renewables generators. In future, it is possible that at least some of these costs could be reflected in the network charges faced by variable renewable generators. This would improve cost-effectiveness much more efficiently than requiring individual wind or solar farms to balance their output.

Carbon pricing

The Helm Review is correct to recommend that a uniform, economy-wide carbon price would be more efficient and should be the aim of future UK government policy. Inconsistent implicit and explicit carbon prices across the UK economy and between different types of user are an economically inefficient way of reducing emissions of greenhouse gases as they do not focus abatement on the most cost-effective options.

The Helm Review proposes a border carbon tax to protect UK firms against the economic impact of a higher domestic carbon price. This is something that the author has advocated for some time (Helm et al., 2012). However, the Helm Review's promotion of high-carbon protectionism is inconsistent with the narrative of low-carbon prosperity contained, for instance, in the Government's Clean Growth Strategy. The UK has very big growth opportunities in low-carbon trade. The global demand for low-carbon goods and services could rise by a factor of ten between now and 2030, according to an analysis by Ricardo AEA (2017) for the Committee on Climate Change. Exploiting these opportunities would be much more rewarding than starting a trade war over the UK's remaining high-carbon industries, important though they are.

Moreover, the threat from carbon policies to UK competitiveness is declining. The Helm Review is wrong to claim that the UK's carbon targets are unilateral. It is true that they are anchored in UK law and therefore not affected by the UK's departure from the European Union. But the UK is not acting alone. There are about 1,400 climate change laws and related policies worldwide (Nachmany et al., 2017) and, putting aside recent changes in policy in the United States, almost every country has signed up to the Paris Agreement. The stronger the carbon policies in these countries, the lower will be the competitiveness impacts of the UK's domestic targets. Competitiveness concerns are further lessened by the fact that low-carbon electricity is becoming cheaper.

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